PERIODICITIES, SOLAR AND METEOROLOGICAL

551.590.2(048)

By C. CHREE

[Reprinted from Science Abstracts, 1924, no. 2688. See Jour. Roy. Meteorolog. Soc., 50, pp. 87-97, April, 1924]

An address, delivered before the Royal Meteorological Society, in the first part of which sun-spot frequencies for the years 1856 to 1921 from Wolfer's lists are compared by various methods with mean yearly values of data relating to Kew Observatory, comprising rainfall, mean temperature, daily range of temperature, sunshine, cloud, mean potential gradient, absolute daily range of magnetic declination, and diurnal inequality range of declination and horizontal force for such periods as they are available. The points which the writer wishes to bring home to meteorologists are the two facts: (1) That an important sun-spot relation does exist in at least one terrestrial element—terrestrial magnetism; (2) that, at least in these latitudes, the evidence for a connection between sun-spot frequency and meteorological phenomena is of quite a different order from the evidence for a connection between sun-spot frequency and terrestrial magnetism.

The considerations put forward amply illustrate the danger of drawing conclusions in such matters as the present from data extending over an insufficient period of time. In the latter part of the paper the author is able, however, to suggest for trial a method by which relationships between sun-spot frequencies and terrestrial elements might be investigated, even though data for the latter may not be available for a number of 11-year periods. Reasons are given for supposing that the difference between magnetically quiet and disturbed days is essentially of the same nature as the difference between quiet days at sun-spot minimum and quiet days at sun-spot maximum. Granting this, any meteorological or electrical element which exhibits the 11-year period will, it is reasonable to suppose, behave differently on days that are magnetically quiet and on days that are magnetically disturbed. The suggestion is, then, that the meteorological data relating to the two classes of days, as well as the electrical data, should be compared at a number of places, it being noted in this connection that the international lists issued from De Bilt will in future specify five disturbed days a month as well as five quiet days. It is shown to be desirable to commence with places in high magnetic latitudes as being most likely to yield best results.—*M. A. G.*

TORNADO CLOUDS

By CLARENCE J. ROOT

[Weather Bureau, Springfield, Ill., December 1, 1924]

An article by Mr. Varney in the August, 1924, number of the MONTHLY WEATHER REVIEW discusses the tapering shape of the damaged area in connection with the tornado at Lorain, Ohio, June 28, 1924. Figure 2 shows the relation of decreasing area at the earth's surface to the rise of the funnel cloud.

This brings to mind the so-called Mattoon tornado of May 26, 1917. The path of this storm was perhaps the longest of record, extending across the entire State of Illinois and three-fourths of Indiana, a distance of 293 miles. Across the State from the Mississippi River almost to Mattoon all eyewitnesses agreed that this storm had the typical funnel-shaped tornado cloud with swinging tail, and east of Charleston the same type of cloud was reported, but the writer who visited Mattoon and Charleston, failed to find anyone in those cities who saw a funnel-shaped cloud. Eyewitnesses who had an unobstructed view agreed that the approaching storm appeared as a low, boiling mass of clouds, one part a little to the north and the other a little to the south. The parts seemed to roll toward one another, coming together and downward like the meshing of a pair of cog wheels. In the official report it was suggested that the cloud was so low that there was no room for the usual pendant portion. The path of serious damage was generally about one-fourth mile in width.

There was ample evidence of tornadic action in Charleston and Mattoon. A barograph trace showed a tornado dip, buildings "exploded," the walls falling outward, and the directions in which the trees lay were typical of the true tornado. The direction of movement was a little north of east. The southern limit of the zone in which the trees fell to the west coincided exactly with the northern limit of the zone of complete destruction. This indicates that the greatest wind force occurred on the south of the actual center of the whirl.

551.571 : 551.508(048)

HUMIDITY RECORDERS

By E. B. WHEELER [1]

[Reprint from Science Abstracts, section A, October 25, 1924, No. 2410]

The material effect of atmospheric conditions upon the operation of intricate electrical and mechanical apparatus, such as is found in telephone systems, is discussed, and the desirability of obtaining accurate information as to the character of the atmospheric conditions obtaining in typical localities is emphasized. The specific advantages and limitations of various well-known types of hygrometers are reviewed and the development of a new recording hygrometer is described in which the Leeds and Northrup automatic recorder is employed in conjunction with wet and dry bulb resistance thermometers in an auxiliary wind-tunnel equipment and a specially designed double Wheatstone bridge circuit. One of the Wheatstone bridges contains the dry bulb thermometer, the other containing both the dry and wet bulb thermometers. The satisfactory performance of a number of such instruments is illustrated in typical graphs. A new direct-reading humidity recorder is also described working on a similar general principle, and depending for its operation upon the approximate linearity and common intersection of the ordinary humidity curves connecting wet and dry bulb temperatures for a given relative humidity.—*A. B. C. L.*

EDITOR'S NOTE.—An examination, by the Instrument Division of the Weather Bureau, of the original paper, indicates that the recorder described is probably more precise than any other which has come to the attention of the division. On the other hand, it is believed to be too expensive and complicated for general meteorological work. Readers of the REVIEW will, however, be interested to know of the existence of this instrument of high precision.

551.515(048)

THE CAUSE OF CYCLONES

By A. H. R. GOLDIE, Edinburgh

[Reprint from Nature, 114: November 29, 1924, pp. 786-787]

In the winter of 1922–23 there appeared in Nature some correspondence on "The cause of anticyclones," and on that occasion I put forward certain views as to the mechanism by which the more rapid increases

[1] Bell System Techn. Jour., 3, pp. 238-258, April, 1924.